REMARKS

The Office Action dated August 04, 2003 has been carefully considered and this Reply prepared in response. Applicants respectfully request reconsideration of the present application in view of the following remarks. No claims have been added or deleted by this reply. Therefore, claims 1-10, 12, and 14-27 remain pending in this application, with claims 1-9, 16, 19-22 and 26-27 being withdrawn from prosecution.

Rejections Under 35 U.S.C. § 102

Claims 10 (the independent claim from which each of the elected claims depend), 14, 15, 17, 18, and 25 stand rejected under 35 U.S.C. §102(b) as being anticipated by Hettiarachchi-I (USP 5,818,893) and Hettiarachchi-II (USP 5,904,991). In response, Applicants respectfully traverse the rejection.

Applicants rely on MPEP § 2131, entitled "Anticipation – Application of 35 U.S.C. 102(a), (b), and (e)," which states that a "claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." It is respectfully submitted that neither of the Hettiarachchi references describe each and every element of amended claim 10.

Claim 10 recites that the method of suppressing corrosion of a reactor structural member includes forming photocatalytic substances formed as particles made of TiO_2 *prior* to introducing the particles into the feedwater of the reactor. That is, TiO_2, a photocatalytic corrosion potential reducing substance, is formed separate from the feedwater of the reactor, and then introduced into the feedwater.

In contrast, neither of the Hettiarachchi references disclose, teach, or suggest introducing TiO_2 into the feedwater of the reactor. The Office Action asserts that the disclosure in the Hettiarachchi references of "a platinum compound being in an aqueous solution or suspension" correlates to an "inherent" formation of TiO_2 in Hettiarachchis' mixture of platinum and titanium, citing columns 5, lines 48+ and lines 50+ in Hettiarachchi '893 and '991, respectively. However, in each of the cited sections, immediately after teaching the relied on aqueous solution, each of the Hettiarachchi references state that "when the metal compound solution or suspension enters the high temperature water, the compound

decomposes very rapidly to produce atoms/ions and the metal (or metals) is incorporated into the metal oxide film." (Hettiarachchi '893, col. 5, lines 50-55; Hettiarachchi '991, col. 5, lines 53-58; emphasis added.) That is, the metal compound or solution (e.g., titanium) must be able to decompose in high temperature water, such as reactor water, to release atoms of the metal. If the metal cannot decompose, no atoms/ions will be released.

Applicants respectfully assert that if titanium is transformed into TiO_2 before introduction into the reactor water as is asserted in the Office Action, atoms/ions will not be released, since TiO_2 is too stable to decompose, even when exposed to the high temperature of reactor water. Therefore, a substantial amount, indeed, the vast majority, of the titanium introduced into the reactors of the Hettiarachchi references must not be in the form of particles made of TiO_2 so that the solution can decompose in the reactor water to release atoms. Thus, the Hettiarachchi references teach away from forming TiO_2 prior to introduction into the feedwater of the reactor.[1]

Still further, assuming *arguendo* that some of the titanium in the solution of the Hettiarachchi references is transformed into TiO_2, the amount will be too small to perform the function of a photocatalytic corrosion potential reducing substance as claimed. Claim 10 recites a method of "controlling a corrosion potential of the reactor structural member by providing . . . *a photocatalytic substance* . . . being formed as particles of TiO_2." Even if some of the titanium of the Hettiarachchi reactors were converted to TiO_2, the quantity would be far too small to control a corrosion potential of the reactor, as is required to anticipate claim 10. Therefore, even if trace amounts of TiO_2 are accidently formed by practicing the Hettiarachchi methods, a photocatalytic substance is still not used to control a corrosion potential of the reactor. Indeed, the introduction of TiO_2 into the reactors of Hettiarachchi is to be avoided, since, as discussed above, TiO_2 is too stable to decompose to transfer atoms per the references' teachings. Moreover, because the Hettiarachchis teach introduction of titanium as a metal (not as TiO_2) into the "aqueous solution," the trace amounts of TiO_2

[1] Indeed, USP 5,774,516, to the same inventor as that of Hettiarachchi '893 and Hettiarachchi '991, listed in Notice of References Cited, includes a table, "Table 1," which shows that ZrO_2(MgO) results in a positive potential, i.e., +90mV(SHE). That is, Hettiarachchi '516 shows that a negative potential cannot be produced by Zr O_2, which has similar properties to those of TiO_2. Therefore, because TiO_2, which has similar properties to those of ZrO_2, cannot produce a negative potential, titanium of metal, not TiO_2, must be used in the Hettiarachchi references to obtain corrosion control.

allegedly inherently formed in the Hettiarachchis are of an uncontrolled particle size and have an uncontrolled crystal structure. Since photocatalytic effects of TiO_2 are influenced by crystal structure and the size of the particle, the photocatalytic effect of any TiO_2 that may be produced by practicing the Hettiarachchi methods is not (it cannot be) controlled. In contrast, by purposely preparing TiO_2 prior to introduction into the reactor water, it is possible to control the crystal structure and particle size of the TiO_2 to obtain a sufficient photocatylitic effect. In sum, the Hettiarachchi references simply fail to teach controlling corrosion potential using a photocatylitic substance according to claim 10. Thus, claim 10 and its dependent claims are allowable for at least this reason.

* * * * *

The Office Action concedes that the Hettiarachchi references do not contain an affirmative teaching of forming TiO_2 *prior* to introducing the particles into the feedwater of the reactor. Recognizing this, the Office Action states that because "the platinum is in the form of an aqueous solution or suspension . . . introduction of titanium with platinum to form a mixture ***inherently*** produces TiO_2."(Office Action, page 5, lines 5-7, emphasis added.) Applicants respectfully rely on MPEP § 2112, which states that while "a rejection under 35 U.S.C. §102/103 can be made when the prior art product seems to be identical except that the prior art is silent to an inherent characteristic," the "[E]xaminer *must* provide rationale or evidence tending to show inherency." (MPEP § 2112, subsections 3 and 4, emphasis added.) It is respectfully submitted that no evidence tending to show inherency has been provided in the present Office Action. Further, it is respectfully submitted that § 2112 inherency is not being properly implemented. In arriving at this conclusion, Applicants provide the following excerpt from MPEP § 2112:

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijkaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that *the missing descriptive matter is necessarily present* in the thing described

> in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) (The claims were drawn to a disposable diaper having three fastening elements. The reference disclosed two fastening elements that could perform the same function as the three fastening elements in the claims. The court construed the claims to require three separate elements and held that the reference did not disclose a separate third fastening element, either expressly or inherently.)

(Emphasis added.) Inherency means that *the missing descriptive matter is necessarily present* in the reference. The courts have allowed the PTO to rely on inherency arguments to free the PTO from the necessity of finding references which explicitly state that inherent elements are present. This is because certain characteristics are inherent, the references will most probably not mention these elements, and, as such, will be difficult to find. For example, it is not necessary to find a reference that explicitly states that plutonium 239 is radioactive, as plutonium 239 is always radioactive. That is, radioactivity is an inherent feature of plutonium 239. However, inherency is not a panacea that enables the PTO to use references which are *deficient* in teaching certain elements of a claim. Recognizing the power of the inherency argument, the courts have tempered its use, as is seen in § 2112, where the PTO has stipulated that the PTO must follow certain procedures before invoking inherency: the "examiner must provide rationale or evidence tending to show inherency." In the present case, no such rationale or evidence has been provided in the Office Action. The statement that "introduction of titanium with platinum to form a mixture inherently produces TiO_2 " does not satisfy the PTO's burden to provide rationale or evidence showing that "the missing descriptive matter is necessarily present." Just as was the case of the third fastener in the example provided in the MPEP quoted above, the subject matter of Applicants' claims is not expressly or inherently disclosed in either of the Hettiarachchi references. Thus, a reference that provides evidence that TiO_2 is necessarily formed prior to introduction of the mixture into the feed water in the Hettiarachchi reactors must be found, else the claims must be allowed. Since the Hettiarachchi references are silent in regard to the above quoted recitation,

and no evidence has been proffered to establish the inherency of the formation of TiO_2, claim 10 and its dependencies are allowable.

* * * * *

Claim 10 also recites that "each particle [has] a surface on which at least one of Pt, Rh, Ru and Pd is provided." Neither of the Hettiarachchi references disclose or suggest such a feature. A previously noted, the Hettiarachchis do state that *mixtures* of platinum group compounds and non-platinum group compounds may be used. However, mixtures do not denote providing Pt on a surface of each particle, as mixtures are known to one of ordinary skill in the chemical arts to be mere concoctions of various elements and compounds having no chemical bonds between them.

The Office Action asserts that Applicants have "admitted that chemical bonding may occur between platinum and titanium in Hettiarachchi's mixture, albeit in trace amounts." Assuming *arguendo* that chemical bonding may occur between platinum and titanium in the cited references, two recitations of claim 10 are still missing: 1) platinum (or one of the other recited elements) being provided on a surface of a particle of TiO_2, not just *Ti* as, at most, would be the case in the references, and 2) utilizing the particles of TiO_2 having a surface on which platinum is provided **to control a corrosion** potential of a reactor.

Regarding the former recitation, to have platinum provided on the surfaces of particles of TiO_2 prior to introduction into the feedwater, TiO_2 must first be formed, which, as discussed above, is not formed in the Hettiarachchis. Regarding the latter recitation, even if the former recitation is obtained in trace amounts by practicing the teachings of the Hettiarachchi references, the trace amounts are too small to be used to control a corrosion potential of a reactor, as is required by claim 10 and its dependencies.

Recognizing that the references fail to explicitly teach the recitation that platinum (or one of the other elements) is provided on the surface of the particles of TiO_2, the Office Action asserts that because platinum is supplied in the mixture, platinum "**inherently**" adheres or coats the surface of the titanium particles of the references. However, no evidence or rationale for the inherency of this phenomenon is provided in the Office Action.

Applicants respectfully direct the reader to the above discussion regarding the requirements on the PTO when proffering an inherency argument, and submit that those requirements are not satisfied in the present Office Aciton. Thus, claim 10 and the claims dependent from claim 10 are allowable for yet another reason.

Claim Rejections Under 35 U.S.C. §103(a)

In the Office Action, claims 10 (the independent claim from which each of the elected claims depend), 14, 15, 17, 18, and 25 stand 35 U.S.C. §103(a) as being unpatentable over Andersen (USP 5,608,766) in view of either of the Hettiarachchi references, and claims 12, 23 and 24 stand rejected as being unpatentable over either of the Hettiarachchi references when combined with Uetake (USP 5,377,245) or Panson (USP 4,842,812). Still further, claims 12, 23, and 24 stand rejected as being unpatentable over a Andersen-Hettiarachchi combination when combined with Uetake or Panson.

Applicants respectfully submit that claim 10 and its dependent claims are allowable for at least the following reasons.

Applicants rely on MPEP § 2143, which states that:

> [t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

It is respectfully submitted that at least the third criteria of MPEP § 2143 cannot be met in view of the cited references.

The Cited References Do Not Suggest All Claim Recitations

Even if the first requirement of MPEP § 2143 could be satisfied, the cited references still do not meet the third requirement, which is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations."

As seen above, the Hettiarachchi references do not teach each and every element of claim 10. Applicants direct the reader's attention to the above discussion on these references in the interest of economy.

Andersen fails to remedy the deficiencies of the Hettiarachchis. Andersen, like the Hettiarachchis, does not disclose, teach, or suggest introducing TiO_2 into the feedwater of the reactor to control a corrosion potential of the reactor utilizing a photocatalytic effect. Like the Hettiarachchis, Andersen teaches introducing Titanium into the feedwater. Andersen does this because he expects that the Titanium will be co-deposited on the reactor component to be protected during re-growth of oxide films on the surface of the reactor component. Also like the Hettiarachchis, Andersen teaches that compounds inserted into the reactor water "**must** have the property that it **decomposes** under reactor thermal conditions to release species of the selected non-noble metal which incorporate in or deposit on the oxide film," where the "non-noble metals which can be used are selected from the group consisting of . . . titanium." (Andersen, col. 8, lines 46-53, emphasis added.) That is, just as is the case with the Hettiarachchis, the compounds must be able to decompose. As TiO_2 is stable even in the high temperatures of a reactor, the formation of TiO_2 is to be avoided. Applicants direct the reader to the above discussion regarding the formation of TiO_2 in the Hettiarachchi references as compared to the claimed subject matter of claim 10, and respectfully assert that the rationale for the allowability of claim 10 in view of the Hettiarachchi references is applicable to the allowability of claim 10 in view of Andersen.

Uetake or Panson do nothing to remedy the deficiencies of the Hettiarachchis or Andersen. Thus, claim 10 and its dependent claims are allowable for at least this reason, but there is more.

Andersen, like the Hettiarachchi references, also does not disclose, teach, or suggest the photocatalytic substances formed as particles having "a surface on which at least one of Pt, Rh, Ru and Pd is provided." Andersen teaches that either noble metals and corrosion-inhibiting metals can be used, but the reference is silent in teaching that noble metals are provided on the surface of photocatalytic substances, and Uetake or Panson do nothing to remedy this deficiency. Indeed, the reference is silent in regard to even utilizing a noble metal in conjunction with a corrosion-inhibiting metal, such as Ti. Applicants again direct the reader to the above discussion of the deficiencies of the Hettiarachci references, except this time to the discussion regarding the lack of formation of Pt, Rh, Ru and Pd on particles of TiO_2 in the Hettiarachchi references as compared to the claimed subject matter of claim 10. Thus, claim 10 and the claims dependent on claim 10 are allowable in view of Andersen for yet another reason.

In sum, even if the first requirement of MPEP § 2143 is satisfied, the third requirement of MPEP § 2143 cannot be satisfied by the references, since the cited art does not teach each and every element of the claimed invention. Thus, the present claims are allowable.

Conclusion

Applicants believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Examiner Palabrica is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

Date January 05, 2004

By _____

FOLEY & LARDNER
Customer Number: 22428
Telephone: (202) 295-4747
Facsimile: (202) 672-5399

Martin J. Cosenza
Attorney for Applicant
Registration No. 48,892